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Presents

Road map on Integrated Water Management 3500 TCD Sugar Mill & 20 MW Co-gen Plant

By

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Water requirement for Sugar & Co-gen

- Sugarcane contains 68-72% water (w/w).
- Sugar mill requires process & cooling water.
- Standalone sugar mill generates surplus water.
- Standalone co-gen plant net consumer of water.

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Various cooling duties in a Sugar Mill are:

- Main injection water circuit
- For equipment cooling at milling tandem
- For equipment cooling in boiling house
- For cooling coils of crystallizers
- Miscellaneous use

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Selection of Technology for Reducing Water Requirement of a Sugar Mill

- Mill Drive :Air cooled AC motors with VFD
- Shredder Drive : Air cooled AC motors
- Process : Defeco Re-melt Phosflotation(DRP)
- Process Steam Consumption : 320 Kg/TC

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Makeup water required for cooling circuits of sugar mill at 160 TCH

No	Particulars	Unit	Qty.
1	Equipment cooling water circuit	M^3/hr	1.2
2	Massecuite cooling water circuit	M^3/hr	0.6
3	Misc. (gland sealing, lab etc.)	M^3/hr	3.2
4	Vacuum filter cooling water circuit	M^3/hr	0.7
5	Main injection water circuit	M^3/hr	12.8
6	Misc. (hosing, rinsing of vessels)	M^3/hr	1.5
7	Grand Total	M^3/hr	20.0

Process water requirement of sugar mill at 160 TCH:

S.No	Particulars	Units	Qty.
1.	For imbibition at mill @ 35% cane	M^3/hr	56.0
2.	For slaking of powdered lime @ 2% cane	M^3/hr	3.2
3.	For cake wash at vacuum filter @ 4% cane	M^3/hr	6.4
4.	For molasses conditioning and melting low grade sugar in raw section @ 6% cane	M^3/hr	9.6
5.	For movement water at vacuum pans @ 4% cane	M^3/hr	6.4
6.	For wash water at centrifugal station @ 4% cane	M^3/hr	6.4
7.	For making magma @ 3% cane	M^3/hr	4.8
8.	For melting raw sugar in the refinery @ 4% cane	M^3/hr	6.4
9.	Total process water requirement @ 62% cane	M^3/hr	99.2

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Surplus condensate at 160 TCH:

The availability of hot condensate water is about 136 m³ per hour (850 lit/tonne cane) while total process water requirement is about 99.2 m³ per hour (620 lit/tonne cane) thus leaving a surplus of about 36.8 m³ per hour (230 lit/tonne cane) from the sugar mill at its rated capacity of 160 TCH.

Available Surplus Condensate , after cooling , at 160 TCH

S No	Particulars	Unit	Qty.
1.	Hot water circulation rate	M^3/hr	36.8
2.	Temperature drop of water	Deg C	42
3.	Total heat load	Mcal/hr	1546
4.	Evaporation losses of water	M^3/hr	2.7
5.	Blow down and drift losses @ 0.8%	M^3/hr	0.3
6.	Water loss rate	M^3/hr	3.0
7.	Net quantity of surplus condensate	M^3/hr	33.8

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Overall water balance of sugar mill at 160 TCH

SNo	Particulars	Unit	Qty.
1	Surplus water outflow from the sugar mill		
1.1	Net flow rate of surplus condensate, after meeting process water requirements and after deducting losses during its cooling .	M^3/hr	33.8
1.2	Recycled cooled water requirement	M^3/hr	20.0
2	Net Surplus condensate (mildly contaminated) flowing out of the premises of the sugar mill	M^3/hr	13.8

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Various areas of water usage in Co-gen Plant

- Make up water for boiler feed
- For equipment cooling at TG Set
- For Condenser water cooling
- Miscellaneous use

Selection of Technology for Reducing Water Requirement of Co-gen Plant

- TG Set Condenser :Air cooled
- Fan Drives : Air cooled AC motors with VFD
- Boiler Feed Water : Make up water heating using exhaust condensate to reduce vent loss.

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Make up water for Co-gen

The available surplus cooled condensate of 13.8 m^3 per hour from the sugar mill at its rated capacity of 160 TCH can be utilized for meeting the make up water required for equipment cooling circuit of the co-gen plant and misc. usage.

Thus fresh water requirement for sugar mill & co-gen plant will be limited to the make up water requirement of the boiler feed water i.e. about 10 ton/hr (10% of boiler generation of 100 TPH)

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THANK YOU

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